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Educational Research Bulletin

OCTOBER 12, 1960
Vol. XXXIX, No. 7

Television Frees the Teacher[1]

By I. KEITH TYLER

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NOTE.—A large part of the September and October issues of the BULLETIN has been devoted to the Midwest Program on Airborne Television Instruction. "Airborne Television: an Educational Experiment," by Shirley Lipson, and "Matching Quantity with Quality in Education," by John E. Ivey, Jr., appeared in September. In this issue the article by Mr. Tyler and "Evaluation and the Airborne Television Project," by Egon G. Guba, continue our coverage of this important project.

THE crucial element in the use of instructional television is the relationship existing between the classroom teacher and the television screen. Does the classroom teacher consider himself in competition with the television program? Does he think of himself as being relegated to a minor role by a "master teacher"? Or does he look upon the medium as an aid or partner in helping learners achieve educational goals? The nature of this relationship profoundly affects what is done from the studio and in the classroom. To clarify this relationship, let us consider the responsibilities which education must shoulder in the years ahead.

A sober view of the mounting problems which the schools face can lead to despair. The task seems overwhelming, if not impossible. In the future the schools must cope with trends, pressures, and demands for which they are ill-prepared. Ever-increasing enrollments will tax our resources to supply enough buildings and equipment. The first postwar enrollment wave is now in our schools, and classroom shortages are being met with double sessions and other makeshift measures. According to a statement

[1] Adapted from a talk given at the Ohio State University Airborne Television Workshop, July 28, 1960.

by the National Education Association, the recent schoolhouse construction has had only a negligible effect in taking care of the additional two million students in schools and colleges this year. Half the classrooms in the United States now contain more than thirty students each. Barring severe economic changes or unpredictable shifts in the birth rate, these staggering increases will continue in a succession of waves, as the children of the pupils in the present postwar wave enter school and again as their children reach school age.

For some time to come, there will be too few qualified teachers. This year, for example, the NEA reports a shortage of 135,000 qualified teachers. The situation is being met by temporary certification granted to those not completing minimum professional requirements, by further increases in class size, or by other emergency measures. The simple fact is that not enough young people are entering teaching. In part this is because the colleges are just beginning to graduate the students born in the war years when the birth rate was low. For the next several years there will be proportionately fewer college graduates from whom teachers can be recruited. At the same time we have failed to make teaching sufficiently attractive, in competition with business, industry, and other professions, to draw a fair share of able students into the profession. So the burden upon those who are teaching will become even heavier.

Tremendous educational problems also result from the migration of American families. An elementary school in Columbus, for example, is reported to have had an enrollment of more than nine hundred in September of a recent school year and a similar number of pupils the following June, but only a handful of the children in the school at the close of the year had been there at the beginning. This school is in a transient neighborhood, but it is a stark example of the effect of the constant movement of families upon schooling. Agricultural migrants, construction workers, engineers, and technicians are continually on the move, keeping pace with the crops or with new industrial developments. And their children have little time to put down roots, to achieve security, or to maintain continuity in their education. Teachers bear the brunt of this educational dislocation.

Even more severe in the demands which it makes upon the schools is the steady movement of great segments of the population toward better living. The centers of our large cities are decaying as people move to the suburbs and further accentuate the

shortages of educational facilities and teachers in these fast-growing communities. At the same time vast hordes are moving into the cities from educationally deprived areas—Puerto Ricans into New York City and rural Negroes and whites from the South into northern cities generally. Typically these families include many children who are, by urban standards, educationally retarded. Furthermore, they come from a simple rural culture and face tremendous problems of adjustment and acculturation to the complexities of metropolitan living. The task of the schools is comparable to that faced at the turn of the century when hosts of immigrants poured into American cities. The schools once again have become the key element in the "melting pot," and teachers must wrestle not only with educational fundamentals but with cultural development as well. Yet the cities are seeing their tax bases dwindle as industry and the more affluent citizens move beyond their borders. The northern states are paying the price for the inadequate educational standards of the states to the south.

As LIFE becomes more complex and technology grows apace, our survival, domestic and international, depends upon continuous invention and development. The need is not only for engineers and technicians but also for those qualified in other professions and services. For the first time we employ more people in services than in the production of goods. We have largely solved the problems of growing, creating, and processing things; now we are demanding more doctors, nurses, psychiatrists, beauty culturists, recreation directors, airline pilots, teachers, lawyers, gas-station attendants, politicians, civil-service workers, stenographers, marriage counselors, and motel operators. The number of common laborers is dwindling, and a variety of specialists are taking their places. Teachers are expected to secure higher levels of competency from pupils at the very time that there are more of them to handle.

These changes in our ways of living are shifting the emphasis of our educational goals. Knowledge, mastery of subject-matter, and accumulation of facts, can no longer receive the primary emphasis. New knowledge is coming so rapidly that the facts of today are the errors of tomorrow. Training students for satisfactory performance in today's world is no guarantee that they will fit into the world of the future. The new emphasis must be upon facility—the ability to handle the new. Thinking rather than mere

memorization, student understanding rather than acquisition of facts, must be stressed. Adjustment to new situations, skill in identifying and solving problems, methods for democratic attack upon human and social ills, facility in getting along with others in an increasingly more crowded world, ways of locating and using needed information, appreciations, attitudes, and values must increasingly become the goals of instruction. To develop such high-level competencies requires the utmost skill and artistry of teachers.

Finally, since the very content of what is taught is changing so rapidly, teachers are going to have increasing difficulty simply in keeping up with their fields. This is why "Continental Classroom," which offers courses in physics, chemistry, and mathematics, is broadcast coast to coast as a means for science teachers to bring themselves up to date on new developments. This is only one example of the need and of one means of helping to meet it. The problem is bound to become even more serious as changes continue at an accelerated pace.

It should be clear that teachers will have no easy job in the years ahead. Their ranks will be augmented by inexperienced and inadequately trained recruits, but the total will still be far from sufficient to take care of the vastly increased pupil enrollments. Furthermore, many schools will have double sessions, and facilities and equipment will be in short supply. The teachers' task will be made more difficult by the large numbers of ill-prepared and culturally backward boys and girls and by children who lack stability and emotional security because of family migration. Teachers must cope with a changing emphasis from facts and subject-matter mastery to facility and broad understanding. And they will have increasing difficulty in keeping up with changing content at the very time when society is demanding higher qualifications from the schools' products. They will need every type of assistance that may relieve drudgery and routine and free them to work closely and intimately with their pupils. Clerical and non-professional assistants may be of some help; technology appears to offer even more aid.

TECHNOLOGICAL developments in teaching-learning are not altogether new. The pity is that so frequently they are not put to effective use. Conventional instruction, characterized by teacher

telling and showing and pupil memorizing and reciting, still predominates in American classrooms.

The printed book was the first teaching machine to find its way into the school. It freed the teacher from the tremendous burden of supplying sheer content. No longer was he required to present all subject-matter orally or prepare written examples and models. The book could do these things better and with greater accuracy and authority. The teacher's time could be spent conducting recitations, practice, and drill, and examining children's achievement. All in all, books are more thoroughly assimilated into school practices than any other aid. But there is still room for improvement. With the broader objectives of learning today, much greater use could be made of reference books. And there is little reason for teachers to repeat orally what can be read by students, although many do, especially at the college level.

Reference materials are another boon to the teacher. Pamphlets, leaflets, pictures, charts, graphs, magazines, newspapers, and special classroom periodicals bring a wealth of material for use by pupils, though the time and effort required for locating, securing, and organizing are formidable. And better reference materials on various levels of difficulty are still needed.

Films also have much to contribute to learning. New titles are continually becoming available, and techniques of production are improving. But use is disappointingly low because of cost, lack of availability on short notice, and the sheer inconvenience associated with ordering, room darkening, and projection.

Another technological aid is filmstrips. They are relatively cheap, abundant, and easy to use. But they require considerable time on the part of the teacher in planning skillful presentations, keyed to the needs of a class or group.

School radio broadcasts also have much to recommend them as teaching devices. Some consist of direct instruction, as in music, rhythmics, or foreign languages. Others make use of enrichment, as in story-telling, dramatic presentation, documentaries, or musical performance. They are intensively used locally where school systems operate their own FM stations, or regionally where schools of the air operate. Production costs are only one-fifth to one-third those of television, and radio can use techniques like drama and on-the-spot recording, the costs of which would be prohibitive in

television. Yet great sections of the United States lack any such broadcasts planned for school use; where they are available, many teachers quietly ignore them.

Teaching machines—programed individual instruction—are beginning to come into their own in a number of fields where drill and mastery of predetermined sequential subject-matter is vital. Language laboratories with tape recorders and record players illustrate what can be done in a field where individual learning activities are of prime importance.

Unfortunately, however, teachers are not making intensive use of these various aids, excepting, of course, the textbook. They are overwhelmed by the monumental burden of presentation, and so have little free time to prepare for the skillful use of the very aids which might help relieve some of this burden. Telling and showing takes far too large a proportion of their time—in planning, preparation, and execution; hence they have no time or energy left to guide the learning of individual pupils, to set up group activities, to nurture inventiveness and creativity, to give guidance to confused or insecure boys and girls, and to provide opportunity for pupil thinking, planning, and problem-solving.

Television, properly conceived and used, can help relieve teachers of the burden of presentation. This newest technological aid is broad-gauged, combining sight, sound, action, immediacy (usually), and convenience. It carries such a semblance of reality that viewers become personally involved, as though they were a part of the action before the cameras.

Consider what television can do when used as an instructional aid:

It conveys personality. When an able, warm, and friendly personality is before the camera, his presence permeates the classroom as though he were actually present. While it is certainly true that television is a superb means for the widespread distribution of mediocrity, it is equally certain that the attributes of an excellent teacher can be communicated to viewers. Because the television teacher is continually looking directly at and speaking to each child as an individual, the pupil often derives emotional security from this relationship as well as being highly motivated toward learning activities.

It brings efficient, quality instruction. Because television teachers usually have large numbers of viewing students, they

make every effort to ensure a superior presentation. The best possible specialists in telling and showing are selected. They are aided by classroom teachers, supervisors, subject-matter specialists, and television producer-directors; they have the rich resources of demonstration equipment and materials and adequate time for planning and rehearsal since a daily television lesson is usually a full teaching load.

It focuses attention on the significant aspects of the presentation. Television is edited reality. Through the eye of the camera, skillfully used, the learner sees the things that are significant and important to the learning experience—extraneous and irrelevant material is eliminated.

It makes superior use of visual material. Television is a kind of omnibus medium. It can transmit a whole range of audio-visual materials—motion pictures, still pictures, *realia* (plants, animals, people, physical objects), models, charts, graphs, records and tape recordings, and even field trips. And these can be explained and related as they are used by the studio teacher.

It can do things classroom teachers cannot. It can, for example, through extreme close-ups enlarge tiny objects like the parts of a flower or the movement of a watch. It can amplify tiny sounds such as the heartbeat of a mouse or the vibration of a tuning fork. It can give a simultaneous view of processes and phenomena in a demonstration, as in a surgical operation or a microscope slide. It can superimpose, or present side by side on a split screen, things which are related, such as technical terminology in conjunction with objects or processes.

It can induce learner participation during the broadcast. Viewers can take part in the broadcast by answering questions orally as a group or as individuals called upon by the classroom teacher. They can fill in charts from observed data. They can carry out experiments or practice skills with guidance from the television teacher. They can repeat foreign words or technical terminology, or they can sing or dance. Even more significantly, they can think, weigh, judge, appreciate, become curious, make inferences, become aware of relationships, or form values.

It can motivate later action and stimulate long-time interests. Interests in broad fields of human activity—science, engineering, music, art, foreign languages, literature—may be engendered by skillful television teaching. Or specific action may be motivated, such as finding out how an airplane flies, writing a poem, creating

a picture, or discovering various views on the causes of the Civil War.

All of these properties make possible a superior and more efficient job of presentation by the television teacher. Thus, the classroom teacher is not only freed of this responsibility, but his job is done for him in less time.

BROADLY speaking, there are two approaches to television, both of which may be of great help to the classroom teacher. In the first place, a television program may be looked upon as *enrichment*—increasing the breadth and depth of the learning experience. It transports to the classroom a slice of life: the real world outside classroom walls is brought in to be examined and analyzed. Perhaps the best examples of such programs are to be found in out-of-school hours on commercial and educational stations. Documentary broadcasts such as "The Population Explosion" or the "Progress of Integration in the South," have been invaluable to students in problems-of-democracy or other social-studies courses. Dramatic presentations of history, science, literature, or social problems do much to illuminate and bring to life instruction in these fields. Quality performances in ballet, opera, music, and drama provide effective examples for student appreciation and emulation. And the significant personalities of our time—poets, writers, statesmen, scientists, and civic leaders—can bring to learners inspiration, motivation, and insight. Unfortunately, except for the interview type of presentation, most such programs are too costly to be produced locally for classroom use.

The Humanities Series, produced for television under a grant from the Fund for the Advancement of Education, aroused great hopes. The programs were to be available nationally for high-school classes. Adequate financing would make possible dramatization and superior performance in the arts not feasible on a local level. Unfortunately, the Fund terminated support after the project had produced a pilot series. At the moment excellent enrichment telecasts for schools are being produced in other countries through their national television organizations; efforts in the United States are confined to telecasts of direct teaching, with occasional enrichment through special guest appearances and film clips. It is only a matter of time until the National Educational Television and Radio Center, or some other nationwide project,

makes available enrichment broadcasts for American schools, utilizing this country's tremendous resources of professional talent or documenting its social and governmental problems on location. The contribution to education of such a vitalizing and quickening of the curriculum is too important to be long neglected.

The second approach to television for schools is *direct teaching*. Whether this is total or supplementary television teaching is not, at the moment, at issue. This approach consists basically of a teacher addressing himself to the camera and using the telling-and-showing method of instruction. He lectures and demonstrates to each learner much as a teacher in the classroom would with the added advantages, just enumerated, which the medium makes possible. On the other hand, of course, he cannot be interrupted for questions, and the continuous flow of presentation puts certain demands upon the learner for concentrated attention. As with the classroom teacher, the studio teacher must direct his lesson at a single level of difficulty, presumably that of the average learner, so that adjustments for the slow learner or the gifted student must be made before or after the presentation.

Practically all telecasts for classrooms in the United States are of this type, in contrast to radio broadcasts which often feature dramatization, quality performance, and recorded actuality. Direct teaching by television is cheaper than enrichment television, it can be done effectively with very limited resources, and it can accomplish much that is important in teaching-learning.

IT MUST always be remembered, however, that direct teaching by television is by no means the whole of teaching. It is simply the presentation part of teaching—the telling and showing. It can help in motivating learners; it can expound ideas and concepts and develop them logically; it can present models to be emulated; it can raise questions and pose problems; and it can provide some drill. But it cannot study individual learners and their interests and needs; it cannot provide individual and group activities; it cannot appraise individual progress; it cannot counsel and advise boys and girls with special problems; it cannot provide laboratory experience; it can do little toward the development of creativity and inventiveness; and it cannot provide much practice in applying principles, gathering data, and handling group problems democratically. Indeed, most of the learning activities necessary

to achieve significant educational objectives take place under the guidance of the classroom teacher or are handled by exceptionally mature students on their own.

It is quite clear that the classroom teacher and the television teacher must work as a team if learners are to achieve important educational goals. Not only must the classroom teacher use the television presentation to take into account individual differences in ability and need; but he must also provide for the development of a wide range of facilities and competencies through individual and group activities. On the other hand, by using television, the classroom teacher will have more time to carry out these most significant responsibilities. He can transfer to the television teacher the burden of presentation both in its planning and execution, and concentrate upon the more personal and satisfying aspects of teaching. I suspect we must restate the role of television as follows: *In general, the classroom teacher should not do what television can do as well or better.* Thus conceived, the use of television in instruction presents a serious challenge to both the television teacher and the classroom teacher.

The television teacher must operate always in terms of the total teaching-learning situation. It is not enough to make a clear and logical presentation. Throughout each broadcast the studio teacher must prepare the way for the varied learning activities which will follow. He must raise questions, formulate problems, stimulate curiosity, motivate action, and leave lessons open-ended. He must conceive of himself as the scene-setter for the drama to come.

The classroom teacher must concentrate upon the face-to-face relationships with learners as individuals and in groups. He must do far less lecturing and more guiding, appraising, counseling, and inspiring. Here lie the deep satisfactions in teaching. Here teachers attain their real successes and make lasting impressions upon their pupils—not by lecturing or by telling and showing, but in setting the conditions for individual growth and group interaction. This is teaching raised to the high level of a fine art, the art of nuturing constructive growth in children and youth.

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Evaluation and the Airborne Television Project[1]

By EGON G. GUBA

Mr. Guba is professor and research associate in the Bureau of Educational Research and Service, and co-ordinator of research for the College of Education, Ohio State University.

I AM sure that it is not necessary to review in depth the general utility of evaluation in education. Evaluation has become such a normal part of everyday educational procedure that we would find it impossible to imagine how a school might operate without it. This is true not only because evaluation has utility in grading, placement, counseling, and other activities which directly relate to or benefit the student but also because proper evaluation programs yield enormous institutional dividends in such areas as establishing objectives; motivating and directing learning experiences; helping to determine learning situations appropriate to the needs, abilities, and potential of the students; improving instruction; and the like. Evaluation is a fruitful method, too, for the discovery and validation of new knowledge through research.

There are, however, some more specific and compelling reasons which argue for the intensive evaluation of the Midwest Program on Airborne Television Instruction. I shall list the more important of these.

1. To protect the investment of the Ford Foundation and other contributing agencies, including the schools, in this project. This is an extremely mundane reason but certainly one of vital importance. I cannot imagine any industry investing seven million dollars—the amount currently allotted to the airborne project—in a new enterprise without making every effort to determine to what extent and in what particulars that enterprise succeeded and failed. And the seven million dollars contributed by the Ford Foundation and other sources is only that portion of the resources to be expended which is most visible. Add to that amount the equivalent of the time and energy to be contributed by the staffs of the area resource universities, the co-operating schools, and the participating children, and the real size of the investment to be made is more apparent. And we must not overlook the by no

[1] An address presented at the Ohio State University Airborne Television Workshop, July 29, 1960.

means trivial cost of the receiving equipment which the schools will need to provide. The point is that we simply cannot afford to allocate so large a portion of our resources without having some way of telling whether "we done good," so to speak.

2. *To take advantage of what, from a researcher's point of view, appears as a once-in-a-lifetime opportunity to collect systematic, related data from an unusually large normative group.* The educational researcher's lot is largely one of collecting available data from small convenience groups—and it is not the researcher's convenience that is served by this arrangement. The midwest airborne project will serve six states, potentially involving some five million students in thirteen thousand separate locations. These students will see exactly the same television broadcast. Any evaluation data collected from the group will have reference to the same courses, the same teachers, and the same methods. Such an opportunity is simply too rare for us not to take full advantage of it.

3. *To help to bring educational television to its full potential as a teaching device.* Most of the research on educational television has been concerned with answering the question of whether or not television can teach as well as the "conventional" methods, whatever may be meant by that ambiguous term. (I shall have more to say about this later.) It is quite apparent that the answer to this question is an overwhelming "yes." But it is time now to explore further the potential of television in its own right. Just what aspects of a course are best taught by television? What aspects might better be left to other media? How can the unique visual properties of television be exploited? How can we artfully take advantage of the features which television uniquely affords —for example, on-the-spot reporting of a presidential address or the presentation of events which cannot be brought into the classroom, such as an atomic explosion. A great deal of evaluation is needed of television in its own terms rather than as simply an expedient solution to problems of economy or teaching quality.

4. *To protect our schools against the very real possibility that the curriculums and methods of the future will be foisted upon us by groups whose professional interests are, to say the least, not educational.* I am appalled by a recurring vision of what the school of the future may be like. I can see the high-school pupil reporting in by punching an IBM card in a time clock (we need to know about his attendance because of truancy laws and because

average attendance figures are important in computing levels of state support). This student reports for his first class to a "viditorium," where he watches a television teacher explain to him today's lesson in, say, French III. Upon conclusion of the televised lesson, he retires to his private cubicle, where he is confronted by two teaching machines. Machine A examines him for mastery of the content of the televised lesson. While administering the examination, Machine A programs Machine B to drill him on those parts of the lesson which the examination discloses he did not understand too well. On completing the drilling, Machine B turns him back to Machine A, which re-examines him. The process proceeds until mastery, or until it is time for the student to return to the viditorium for his next class. In this day of automats and automatic pin-setting machines, it does not seem too ridiculous to suggest that the student may get his lunch and physical education in the same impersonal way that he gets everything else. Thus we may arrange things so that he will never have to see either a teacher or another student face to face.

I have, of course, caricatured my position. No one has actually suggested anything like the school I have described. Yet every one of the components which are included in this description already exists, at least in prototype, as do other devices a good deal more bizarre. What concerns me about this is not that such devices are being developed or that such thoughts are being entertained, but that in the main these suggestions come, not from educators, but from industrial designers, electronics engineers, or school architects. These notions may possibly have a great deal of merit, but it is high time that the educational fraternity took seriously the question of just how much merit there is and under what circumstances we may expect to have it accrue. The present midwest airborne program provides us an admirable opportunity to take a real "giant step" in that direction.

5. *To help discover solutions to certain emergent problems which threaten to overwhelm us.* In the past decade our schools have been threatened by a series of problems which we have not yet been able to solve and which promise to become even more acute in the years just ahead. Everyone is familiar with these problems, and I need only name them to conjure up terrible images —mushrooming enrollment; acute teacher shortages, not only overt shortages of staffs to man the classrooms but also covert shortages arising from the employment of low-quality teachers;

insufficient school facilities; demands, often conflicting, for drastic curriculum revisions (I recall all too vividly a cartoon that appeared shortly after Russia fired her first Sputnik which showed a well-to-do "John Q. Public" standing in a pitifully meager science classroom, peeling large-denomination bills from a fat bank roll, handing them to the startled teacher, and saying, "What I would really like is Instant Science"); ever-spiraling costs of education; the vast increase of knowledge in many fields which must somehow be incorporated into the schools' programs; and continual wrestling with the many social changes which have been brought about by the application of that new knowledge, particularly in medicine and technology. Television has been seen in many quarters as the heaven-sent solution to these problems. To what extent, if at all, is this true? We shall rarely again have the opportunity to answer this question in the depth afforded by the midwest airborne program.

6. *To catalyze and facilitate action research at the local level.* No program of the scope of the airborne television project can be utilized by a school system without occasioning many questions about the purposes, directions, methods, and effectiveness of the local school operation. These questions are always with us, but rarely are they answered because of the magnitude of the work which would be necessary. Circumstances of unusual import are often required before a proper self-study can be initiated. It seems likely that the airborne project may well provide these special circumstances for many local school systems. The existence of an over-all evaluation program into which school systems can project themselves to get answers to some of their questions and to provide methods and direction to answer other questions is thus of great utility. It need hardly be said that the data so developed in local schools will be useful in turn in helping to assess the over-all impact of the airborne program.

7. *To determine the feasibility of a large-scale, geographically free-form organization for dealing with instructional television.* Television as an instructional tool is undoubtedly here to stay. Because of its very nature as a mass medium capable of saturating large geographic areas simultaneously and without respect for school-district or other political or geographic boundaries, television must be managed by groups that also transcend these arbitrary limits. The necessity for developing a working communication system of mutually responsible persons to produce, distribute, and utilize instructional television is apparent. The

midwest airborne project as a prototype of such an organization will provide valuable data concerning the problems that are likely to be encountered, and fruitful and unfruitful methods of dealing with them. The evaluation of the airborne project as a social phenomenon designed to deal with regional communications is thus of widespread interest and compelling importance.

I HOPE these brief statements will convey something of the great sense of urgency that I feel in seeing to it that the airborne television project, and indeed any project that has to do with the utilization of new media in instruction, is properly evaluated. I should like to turn now to a consideration of what, in my opinion, are the questions which urgently require answers and toward which any evaluation ought to be directed. I have been able to identify fourteen categories of such questions.

1. Questions concerning direct learning. As I have already indicated, most of the research in television instruction has been concerned with the question of whether or not televised instruction is as effective as "conventional" instruction. Before going on to point out what important questions remain unanswered in the area of direct learning, I should like to take a moment to document my contention that this first, obvious question has repeatedly been answered "yes." For one thing, leaders in television education have recently urged schools not to insist on endless repetition of such studies to be sure that television will work in their situation. Witness, for example, the excellent papers delivered recently at a special symposium sponsored jointly by the Center for Advanced Study in the Behavioral Sciences and the United States Office of Education.[2]

More impressive factual documentation is found in a recent issue of the *Bulletin of the California State Department of Education,* prepared by special consultant William H. Allen to provide a comprehensive picture of the present state of television education.[3] The studies encompassed four school levels—elementary, junior-high, senior-high, and junior-college—and attempted to show the effectiveness of educational television within each group. Of the 159 individual studies reported, 31 favored televised instruction, 14 favored conventional instruction, and 114 showed "no difference." These findings are paralleled closely at the college level, as attested, for example, by the well-known reports of

[2] Schramm, Wilbur, editor. "New Teaching Aids for the American Classroom." Stanford, California: Stanford University Institute for Communication Research, 1960.
[3] "Television for California Schools," XXIX (April, 1960).

research of the Pennsylvania State University,[4] Miami University,[5] and the Inter-Institutional Television Experiment conducted in Oregon.[6]

The same studies, rearranged by content area, yielded substantially the same results. "No difference" findings were reported in 27 of 39 studies in social studies, 32 of 42 in science, 28 of 40 in language arts, 17 of 23 in mathematics, and 10 of 15 in other content areas.

If we may assume that the question of whether television can teach at all has been satisfactorily disposed of, we may properly inquire what other questions of interest remain unanswered in the area of direct learning. These can best be illustrated by means of Figure 1, which presents the dimensions of academic learning based on content and levels.

Levels	Experiences Leading Toward or Increasing:			
	Democratic Citizenship	Physical and Mental Health	Skills	Enrichment
Action	1	2	3	4
Reaction	5	6	7	8
Interaction	9	10	11	12

Fig. 1. The dimensions of academic learning

The content dimension is arbitrarily defined in terms of four types of learning experiences which Helen Heffernan has suggested are, or should be, provided by most elementary and secondary schools.[7] These are:

Experiences leading to active democratic leadership in our society
Experiences leading to optimal physical and mental health and optimal development as an individual personality
Experiences increasing the skills of learners (including the usual three R's)
Experiences that are enriching in our culture (music, drama, and so forth)

The levels dimension is defined in terms of three levels at which the student may take part in any of the school experiences:

[4] Carpenter, C. R., and Greenhill, L. P. *An Investigation of Closed-Circuit Television for Teaching University Courses: Report Number One.* University Park, Pennsylvania: Pennsylvania State University, July, 1955; *Report Number Two,* Spring, 1958.

[5] Macomber, F. G., and Siegel, L. *Final Report of the Experimental Study in Instructional Procedures.* Oxford, Ohio: Miami University, January, 1960.

[6] Starlin, G., and Lallas, J. E. *Inter-Institutional Teaching by Television in the Oregon State System of Higher Education.* Eugene, Oregon: Oregon State System of Higher Education, March, 1960.

[7] "We Must Seek the Richest Possible Experiences," *Opportunities for Learning: Guidelines for Television.* Washington, D. C.: National Education Association, 1960, pp. 48–49.

The *action* level, in which the student on his own initiative teaches himself through suitable material
The *reaction* level, in which the student learns by reacting to the instruction of a teacher
The *interaction* level, in which the student learns by interaction with the teacher and other students

The cells of the grid are defined by the intersection of the several levels of these two dimensions. So it is possible to teach some aspects of democratic citizenship at the action level (Cell 1), some at the reaction level (Cell 5), and yet others at the interaction level (Cell 9).

It seems that the major question which still needs to be asked about educational television is this: What contribution can educational television make to the kind and level of learning displayed in each cell of this figure?

The point has already been made that almost all television research to date has been concerned with Cell 7—the reaction-skills area, for example, the lecture method of teaching ancient history or the demonstration method of teaching chemistry. Cell 7 is that in which the teacher acts like what Keith Tyler has called "a talking and demonstrating textbook"—"telling and showing" what the pupil must know.[8] This telling-and-showing approach is probably very efficient for presenting new materials, developing concepts, showing relationships, and transmitting information. Indeed, there can be little doubt even without research evidence that such teaching can be carried on as effectively by television as by almost any other medium, including a live teacher in a regular classroom. We should note in passing, however, that certain areas relevant to Cell 7 have not been studied—analyzing and solving problems, evaluating, discriminating, and the like—and we should include these in any future programmatic research.

Unfortunately, there has been almost no research relevant to the remaining cells of this figure. This is especially true at the interaction level. Processes such as group planning, discussion, decision-making, working effectively with others, developing leadership skills, and the like, require group conditions for learning. Television is patently useless here as a total teaching device (when used in this way, it is almost by definition confined to the reaction level); but it may have certain supplementary uses. To date there has been no research on the effectiveness of television

[8] "What Research Does Not Say about Teaching by Television." Paper delivered at the annual convention of the American Association of School Administrators, Atlantic City, New Jersey, February 16, 1960.

in situations in which the teacher must assume the role of moderator or discussion leader. Unanswered also are questions about the catalytic effects of group learning: thus it may be possible that learning which can occur effectively at the action or the reaction level might nevertheless be greatly expedited if it took place at the interaction level.

And finally, we ought also to be concerned about the possible effects on the students resulting from the lack of active participation in helping to plan the work, in weighing alternatives, in making value judgments, and in developing procedures to hasten their own learning. Is it possible that the lack of such opportunities to participate might rob them of their initiative, their creativity, or their ability to plan or make decisions?

Professional interest in these questions is by no means limited to teachers. The schools provide a most interesting and easily accessible "natural laboratory" for professionals from a variety of social-science and technical areas. Thus, the questions raised here should concern not only teachers and school administrators but also educational psychologists, learning theorists, curriculum and methods experts, and educationists (as distinguished from teachers).

2. *Questions concerning concomitant learning.* Pupils always learn something in school but what they learn is determined at least as much by their own needs and goals as by the formal curriculum or the formal method of instruction. As educators, we are naturally concerned with the attitudes and values which pupils derive from our teaching. Among the more important of these is a cultivated willingness to apply in their own life situations what they have learned in the classroom.

We are also concerned with what might be termed the methodological sets which students develop—their biases, their tendency toward openness, their creativity, and the like. Finally we are interested in the psychological orientations of our students —their feelings of security, their acceptance of themselves and of others, their affectional state. These three concomitants inevitably occur in any learning situation; our problem is to inquire into what kind of attitudes and values, what kind of methodological sets, and what kind of psychological orientations are fostered by television instruction. Can instructional television be adapted so as to promote deliberately the acquisition of certain attitudes, values, sets, and orientations which we would like our students

to have? If it is not possible deliberately to transmit these concomitants by the television medium, what can be done at least to prevent the acquisition of negative aspects, that is, wrong attitudes, values, and the like? Can television be made "neutral" in this respect? Such questions would be of theoretical interest not only to teachers but also to psychologists, learning theorists, and educationists in general.

3. Questions concerning the curriculum. Any educational-television broadcast necessarily makes certain assumptions about the nature of the curriculum and the function that the television broadcast is to serve in relation to that curriculum. Television may be supposed to be useful for a "total" teaching job, that is, to take the place of the teacher entirely except to keep order, grade papers, and so forth. We hear this assumption expressed often in terms of what is called the "quality floor" concept. On the other hand, television may be regarded as a supplementary medium assisting the teacher in those areas in which he is least competent or with which he is least able to deal in the ordinary classroom situation. Or further, television may be viewed as an "enriching" device. How can educational television be best used in each of these three cases? Is each a valid area for television in the first place? Onto whom does the responsibility for curriculum planning devolve; to put it bluntly, is the curriculum imposed from above, as the "quality floor" people often imply, or does it develop from active participation of teachers everywhere?

Another aspect of this problem involves the flexibility of the televised curriculum. When decisions about the nature of the curriculum have been made and large amounts of time and money have been spent to implement these decisions in kinescope or tape recording, how flexible is the curriculum likely to be? What adaptations can the individual teacher make of highly organized material which comes to him inexorably day in and day out at an unchangeable pace? What are the desirable and undesirable aspects of the uniform curriculum which are likely to result? Does this situation develop, as Edgar Dale suggests, to a point at which "the student answers questions but he does not question answers"?[9] Curriculum experts, educational philosophers, social psychologists, and content experts have a large stake in these questions.

[9] "New Techniques of Teaching," *The Two Ends of the Log: Learning and Teaching in Today's College*. Russell M. Cooper, editor. Minneapolis, Minnesota: University of Minnesota Press, 1958, p. 193.

4. Questions concerning teaching methodology. Several areas of questions are relevant to teaching methodology. First, while television teaching is in many respects similar to classroom teaching, there are some major differences between the two. Some methods which are quite adequate in the normal classroom situation—for example, the Socratic method—would be entirely inappropriate for television; and undoubtedly there are some methodological approaches, perhaps as yet unformulated, which would be excellent for television use even though not especially suitable for the normal classroom—for example, the narrative travelogue. We need to discover what these effective approaches are and to test them in a large variety of circumstances.

Another aspect of the methodological problem goes back to an issue I have already raised: whether television is to be used to do a total or a supplementary teaching job. What limitations are placed upon the classroom teacher in the former case? Is the teaching time from which he is relieved to be used in some other ways, and if so, what are these ways? What approaches should be taken in the television lessons to reinforce and support the classroom teacher best?

A third aspect of the methodological problem has to do with flexibility. How can mass instructional television be carried out so that the telelessons can be used in meeting a wide variety of disparate objectives found in specific school situations? Can program timing be made more flexible—perhaps even to the extent of permitting discussion to take place during the telecast? Can programs be made more open-ended, that is, arranged to raise questions rather than to give answers? What would be the proper methodological role of the teacher in taking advantage of such increased timing flexibility and open-endedness? Certainly these issues are of vital importance to teaching methodologists, learning theorists, communications experts, and television producers and directors.

5. Questions concerning teacher planning. If proper day-to-day planning is as important to ordinary teaching as professors of education would like us to believe, it is obviously a great deal more important when more than one teacher is responsible for the teaching, as is the usual case in instructional television. How do studio and classroom teachers divide the teaching functions between them when: (a) television is used for "total" teaching, (b) television is used for the major teaching job but the classroom teacher has supplementary duties such as question-answering or

discussion-leading, or (c) the major teaching is done in the classroom but television is used for enrichment or other supplementary purposes? How are the studio and classroom activities articulated? How do classroom teachers prepare their classes for the telelesson, and how do they capitalize on it afterward? Are manuals or aids necessary; and if so, what form should they take? Obviously curriculum specialists, educational methodologists, and television producers and directors have some stake in these questions.

6. Questions concerning the general role of the teacher—both studio and classroom. In this paper the term *role* will mean that set of expectations which any legitimate group may hold for the teacher. There seem to be two distinct problems here. The first may be thought of as primarily sociological in nature. What are the expectations held for both studio and classroom teachers by these groups themselves, by their alters (studio teachers are alters to classroom teachers, and vice versa), by their students, by school administrators, by other uninvolved teachers, by school patrons, by school boards, by professional educationists, and by other relevant groups? What similarities and what differences exist in the expectations of these several (and please note, all legitimate) groups? Further, regardless of what the expectations may be, how are studio and classroom teachers perceived by these groups? Are the studio teachers, for example, seen as the stars while the classroom teachers appear to be mere knob-twirlers?

The second problem in this area is perhaps more directly related to educational issues. This is the problem of teaching effectiveness, which, goodness knows, has not by any means been solved in the normal teaching situation. But it is clear that the effective television teacher need not necessarily be an effective classroom teacher just as the converse is true. In trying to identify teachers who will be effective on television, what selective criteria should be applied? How can such criteria be derived? How much of the judgment of effectiveness should be based on personal qualities of the teacher, how much on the methods of teaching which he uses, and how much on the situation in which he teaches? Educational methodologists, educational philosophers, sociologists, and social psychologists could have a field day with these problems.

7. Questions concerning the role of the school. Is the "new" school, the school of the future, to be a custodian, refiner, or transmitter of knowledge in the sense in which we know it today? Is it to be an educational factory in which the student gets major

instruction in the "viditorium" from televised lessons and is then drilled by impersonal machines until mastery is achieved? Or is it to be some sensible extension of the best present practice, augmented to take advantage of new discoveries in communication? What sort of teachers will be needed for whatever role the school may play? What will be the criteria for adequacy of school facilities? What will be the community's perception of this "school of the future," and how might this perception influence the level of financial and moral support accorded to the school by the community? For example, if the community regards its local teachers only as knob-twirlers and disciplinarians whose function it is to see to it that the students' attention is riveted to the television screen, how will they react to a proposed increase in teachers' salaries? School administrators, sociologists, school-building planners, and educational methodologists will find this series of questions most interesting.

8. Questions concerning the role of the student. As in the case of the teacher's role, the student's role also can be viewed from an educational and a sociological perspective. Let us consider the former first. Learning from television is perhaps no different from learning in any other way, but there are probably some special techniques which the student ought to cultivate to get the most out of his televised lessons. We read differently for enjoyment than for information, and perhaps we need to view television differently to learn than to be entertained. What "study habits," so to speak, are best for telelearning? Teacher activities of "telling and showing," common enough to teleteaching, must by implication be accompanied by student activities of "listening" and looking." What patterns of listening and looking are most effective? Do these patterns vary as a function of individual differences? At what levels of intelligence, maturity, and motivation does instructional television become a significant contributor to learning?

Turning now to the sociological aspect of the role of the student, we may wonder whether a pupil feels any sense of commitment or belongingness in a classroom in which all or a good part of his instruction comes via the television screen. Does he tend to identify with the classroom teacher or the studio teacher? Under what circumstances does each kind of identification occur? From whom does he seek help with problems? What kinds of problems and questions are raised? What is the level of rapport in a television class between the teacher and the student? (I would

like to pass on to you, as an aside, a comment Edgar Dale made about this paragraph when he read an advance copy of the paper. He expressed some concern whether excessive machine teaching might not result in a considerable estrangement from the school for many pupils. "What," he inquired, "are [pupils] supposed to do on graduation day—give three cheers for IBM?") These questions should certainly be of interest to learning theorists, differential psychologists, educationists, sociologists and social psychologists, and counselors.

9. Questions concerning the role of television specialists. The term "television specialist," as used here, refers not only to someone who knows the difference between an image orthicon and a vidicon tube, but more specifically to someone who stands in the same relation to learning by television as the reading specialist stands in relation to learning by reading. Television producers and directors in part fall into this class, and we may very well inquire into their role. To what extent do these individuals make curricular or educational decisions through their control of what is actually beamed out of the studio? How does the director's selection of emphases, length of shot, type of close-up, and so forth, help to determine the educational value of the program? Can we study televiewing difficulties from a technical point of view in the same way that we have studied reading difficulties, and from such study amass the technical knowledge of how best to structure an educational program for maximal learning? Surely questions such as these would be of great importance to television producers and directors, curriculum experts, specialists in methodology, and perception psychologists.

10. Questions concerning teacher-training curriculums. There can be little doubt that television teaching is here to stay. The teacher in the school of the future may well have to possess some skills as a studio teacher, and he will almost surely need to deal with television teaching in the classroom. What changes in current teacher-training curriculums seem to be required by this circumstance? What new skills should we transmit to our trainees? What new selection criteria should we apply to teacher candidates? These questions seem appropriate for professors of education and administrators of departments, schools, or colleges of education.

11. Questions concerning instructional television as a catalytic or motivating agent. As suggested earlier, an important reason for evaluating the airborne project is to catalyze and facilitate action

research at the local level. It has been the experience of many persons who have worked in the area of televised education that the introduction of television teaching, whether it is liked or not and whether it is ultimately retained or not, spurs a searching look at curriculum, methods, and objectives that is not likely to be obtained otherwise without enormous effort. However, we lack specific information on why this occurs, how deeply the effects of such inquiry are felt, and how permanent the changes that arise because of it may be. It is useful to inquire whether instructional television, while teaching children, might not also be teaching the teachers. These questions would be of interest to school administrators, curriculum specialists, supervisors, and content experts.

12. Questions concerning efficiency. Advocates of instructional television frequently assert that one of its chief virtues is increased efficiency in terms of saving staff time and other resources. Specific data are hard to come by in this area, however. Does the use of instructional television result in actual savings of resources—time, money, materials, and so forth? If so, under what circumstances? What are the boundary conditions under which the use of instructional television becomes profitable? Can teachers be redeployed to other duties, such as providing more individual attention and counseling, as a result of savings effected through the use of instructional television? Would potential savings in staff resources at some point balance out the additional costs of large-scale instructional television? Questions such as these are of the utmost importance to school administrators, not to mention the long-suffering taxpayer.

13. Questions concerning technical matters. The utilization of instructional television brings with it a mass of technical problems which are still largely unresolved, although reams of advice, promulgated especially by manufacturers of television equipment, abound.[10] What sort of receiving installation is best for the schools? What physical arrangements are ideal in the classroom? If the school system contemplates an open- or closed-circuit origination and transmission center, what sorts of equipment and personnel will be required? What are the problems of production in a given school setting, and how can they best be met? These

[10] An outstanding exception to my generalization that most information presently available is inadequate is found in the brochure, *Design for ETV: Planning for Schools with Television* (1960), prepared by David Chapman, Inc. It can be obtained from Educational Facilities Laboratories, Inc., 477 Madison Ave., New York 22, New York.

questions are of interest to television-production experts, electronics specialists, and school administrators.

14. Questions concerning automation and technological unemployment. Whenever mass-production devices are introduced, some fear is always expressed that many persons will be summarily thrown out of work as quickly as automated devices can be built to replace them. Teaching is no exception, and some persons see in the advent of television teaching the eventual replacement of the classroom teacher or, if not that, at least the development of a caste system in which the classroom teacher is at a decided disadvantage. How much basis is there for such a belief? How much of the educational process could be geared to electronic devices, even supposing that someone were of a mind to do this? Will some teachers be replaced, and if so, what will become of them? These questions should interest sociologists, administrators, television-production specialists, and representatives of teacher organizations such as the NEA.

THIS concludes my listing of the areas of questions which we must answer as rapidly as possible. I think you will agree that it is a staggering list.

I do not know how many of these questions can be studied as a part of the Midwest Program for Airborne Television Instruction. My feeling is that it is perhaps already too late to include a number of them, because the instructional program of the airborne project appears to be well developed already. From experience we know that whenever the programmatic aspects of a project become relatively "firmed up," it is impossible to do much more after that time than simply to collect data on how well the particular aspects which were included did whatever they were supposed to do. It is impossible to ask experimental questions which involve manipulation or structuring if no further structuring is possible. So, for example, we cannot inquire which of two procedures is better if only one procedure is included in the program. This is simply one of the facts of life that speaks loudly for including considerations of research and evaluation as early as possible in the development of a project of this sort. It will still be possible, nevertheless, to accomplish a good deal if the local school systems co-operate with the evaluation program that is established.

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EDITORIAL COMMENT

An Unused Resource for Teaching and Learning

THERE is widespread agreement on the value of firsthand experience for students at all levels of school work. Such experience can make the subject-matter in arithmetic, biology, history, and other subjects "come alive." Good films, telecasts, and other audio-visual materials, in the hands of good teachers, can be of great value in making subject-matter in these and other fields meaningful to pupils. But the use of such aids does not invalidate the need for firsthand experience with things themselves. Students who have seen a first-rate film of the Battle of Gettysburg can still profit greatly from a visit to the battlefield, where they can see the buildings that served as headquarters for Meade and Lee, the fields across which Pickett made his fateful charge, and the place where Lincoln delivered his address.

In recent years, there has been increasing recognition of the value of firsthand experience in the school program. As a result, we have seen great increases in school camping and in field trips to parks, farms, courts, city waterworks, and the like. This is all to the good: we need much fuller development of these types of learning experience.

Valuable as school camping and off-campus field trips are, however, they by no means fully meet the need for firsthand experience. Camping programs are the exception rather than the rule: the great majority of schools do not offer them and are not likely to do so very soon. Those that do provide camping ordinarily make it available to a pupil only once during his school career. Off-campus field trips are expensive in time and money and tend to disrupt the school's schedule. Hence, the number of such trips that can be taken by a class is limited: in many schools each class is restricted to one trip a year.

The growing recognition of the importance of firsthand experience has led to a movement to develop school forests and other outdoor laboratory facilities as components of school plants. This is highly desirable; it is to be hoped that many such laboratories will be provided as new schools are built. But for a long time to come, the great majority of schools will not have any such specially designed facilities.

THERE is, however, one type of outdoor-education facility which is available to practically every school and which can be used any day—the school ground itself. Almost every school ground offers rich resources for learning, particularly in biology and earth science. If the teacher has the requisite knowledge and skill, he can find there numerous examples to illustrate geological, biological, ecological, and other principles.

Let us cite an example. The Ohio Conservation Laboratory is a special course in conservation education for teachers, conducted each summer under the auspices of four state universities of Ohio. Each year the students and staff of the Laboratory spend a half day on the ground of the nearest village school, studying the opportunities it offers for the teaching of biology, ecology, and conservation.

There is nothing exceptional about this school. It serves an exempted village with a relatively stable population of about twenty-seven hundred. In 1959–60, some sixteen hundred pupils from the village and surrounding territory were enrolled. There are three buildings: two are fairly old and one is much newer. The land is rather flat and, of course, the ground was not designed as an educational laboratory.

But it, together with the adjacent streets and lots, offers rich learning opportunities. Without leaving the ground, students can study the characteristics of more than twenty species of trees and many other common plants. They can see examples of sheet and gully erosion and plant succession. They can observe stream systems with their divides and basins, and man-made microdeserts. They can view some of the consequences of soil impaction and of floods. They can see evidence of the striking force of raindrops and thus acquire a keener appreciation of the significance of the formula for kinetic energy: $E = \frac{1}{2}mv^2$. They have many opportunities to observe the effects of man's use of the land. And so for many other facts and principles. Comparable learning opportunities are provided by hundreds of school grounds in this and other states.

Most teachers have made little or no use of their school grounds as laboratories because they have not been trained to do so. Pre-service teacher-education programs ought to provide instruction and experience which would develop this kind of competence; many in-service workshops should have this as an objective.

Ohio is fortunate at the moment in having an unusual opportunity to promote such use of school grounds. The Ohio Academy of Science has recently announced a highly promising Visiting Scientists Program, under which the services of scientists as visiting specialists will be made available to the secondary schools of the state. The scientists will serve as consultants, lecturers, seminar leaders, and in other capacities.[1] We hope that in many cases they will encourage and assist the schools with which they work to use their grounds in the ways suggested here.

Let us continue and extend the practice of conducting off-campus field trips; let us encourage in every way possible the development of school-camping programs and the planning and construction of school forests and other specially designed outdoor laboratories. But let us also make good use of the outdoor educational facilities already at our doorsteps—the school grounds.

R. H. E.

[1] We expect to discuss this program of the Academy at greater length in the November issue of the BULLETIN.

The University of Chicago Laboratory School has been awarded a grant of $9,500 by the Educational Facilities Laboratories, Inc., to construct and equip six special rooms in its new $2,500,000 University High School. These will provide a flexible team-teaching instructional facility, which will be used as a teaching-learning laboratory. It will be used to accommodate groups of various sizes, organized for a variety of purposes. The equipment will include many new communication devices. The grant will pay the cost of altering design and construction of the six rooms so as to provide for the installation of flexible walls and for the development of new communication equipment, furniture, and acoustical treatment.

RECENT PUBLICATIONS

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By MELVIN SEEMAN. Educational Research Monographs, Number 35. xiv + 149 pp. 1960. $4.00, cloth; $3.00, paper.

In this study the author examines leadership in the schools by using rigorous empirical techniques but interpreting his data in broad terms.

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By SHIRLEY LIPSON AND ANNE W. ABRAMS. vi + 18 pp. 1960. 25 cents.

This new edition expands much of the information found in the original Manual. It is intended primarily for use in preparing the research paper, but a substantial portion is devoted to rules of capitalization and punctuation. High-school students may find many of the suggestions useful.

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The librarian of the Ohio State University School has prepared an annotated list of books arranged according to three levels of difficulty.

Exploring Independent Reading in the Primary Grades.

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